APPENDIX A

RECORD OF DECISION

N.B. The Record of Decision dated September 30, 2005 included voluminous Appendices which are not reproduced here:

APPENDIX I.	FIGURES
APPENDIX II	TABLES
APPENDIX III	ADMINISTRATIVE RECORD INDEX
APPENDIX IV	RESPONSIVENESS SUMMARY

These Appendices are available through the United States Environmental Protection Agency, Region 2, Attn: George Shanahan, Assistant Regional Counsel, telephone no.(212) 637-3171; e-mail "shanahan.george@epa.gov"

RECORD OF DECISION

Peter Cooper Landfill Superfund Site
Village of Gowanda, Cattaraugus County, New York

United States Environmental Protection Agency
Region II
New York, New York
September 2005

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Peter Cooper Landfill Superfund Site
Village of Gowanda, Cattaraugus County, New York

Superfund Site Identification Number: NYD980530265

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's (EPA's) selection of a remedy for the Peter Cooper Landfill Superfund site (Site), which is chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §9601, *et seq.*, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. Part 300. This decision document explains the factual and legal basis for selecting the remedy for the Site. The attached index (see Appendix III) identifies the items that, together with this ROD, comprise the Administrative Record upon which the selection of the remedy is based.

The New York State Department of Environmental Conservation (NYSDEC) was provided with an opportunity to concur with the recommended remedy in accordance with CERCLA Section 121(f), 42 U.S.C. §9621(f). Any future letter from the State of New York regarding concurrence on the selected remedy will be added to the Site Repositories.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment from actual or threatened releases of hazardous substances into the environment.

DESCRIPTION OF THE SELECTED REMEDY

The response action described in this document represents the only planned remedy for the Site. The major components of the selected remedy include the following:

- Excavating the three hot spot areas and consolidating them within the Elevated Fill Subarea, then capping the 5-acre Elevated Fill Subarea of the inactive landfill area with a low permeability, equivalent design barrier cap, consistent with the requirements of 6 NYCRR Part 360, including seeding with a mixture to foster natural habitat;

- Post-excavation confirmatory soil sampling;

- Backfilling of excavated areas with clean fill;

- Collecting the leachate seeps, pretreating the leachate as necessary, then discharging the leachate to the Public Owned Treatment Works (POTW) collection system for further treatment and discharge. As a contingency, if treatment of the leachate seep at the POTW is not available, the leachate would be treated and discharged to Cattaraugus Creek. Since the installation of the cap and groundwater diversion system (described below) should reduce leachate generation, the volume of seep leachate requiring treatment is anticipated to be reduced or eliminated over time;

- Installing a groundwater diversion system to limit groundwater migration through the Elevated Fill Subarea. However, should additional data collected in the remedial design phase of the project support the conclusion that the installation of a diversion wall will result in a minimal increase in the collection of contaminants by the leachate collection system, the diversion wall would not be installed;

- Installing a passive gas venting system for proper venting of the 5-acre Elevated Fill Subarea of the inactive landfill area;

- Stabilizing the banks of the Cattaraugus Creek;

- Performing long-term operation and maintenance including inspections and repairs of the landfill cap, gas venting, and leachate systems;

- Performing air monitoring, surface water and groundwater quality monitoring; and

- Evaluating Site conditions at least once every five years to determine if the remedy remains protective.

This remedy also includes institutional controls such as restrictive covenants and environmental easements for limiting future use of the Site and the groundwater to ensure that the implemented remedial measures will not be disturbed and that the Site will not be used for purposes incompatible with the completed remedial action. The institutional controls will include a Site Management Plan to ensure appropriate handling of subsurface soils during redevelopment. To ensure that the engineering and institutional controls remain in place and effective for the protection of public health and the environment, an annual certification, commencing from the date of implementation, must be made by the parties responsible for the remediation.

The selected remedy will address source materials constituting principal threats by excavating and consolidating and containing contaminated soil on the Site.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA §121. It is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The selected remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. In keeping with the statutory preference for treatment that reduces toxicity, mobility, or volume of contaminated media as a principal element of the remedy, the leachate seeps will be treated.

While the groundwater component of the selected remedy does not satisfy the statutory preference to reduce the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants through treatment, the groundwater contamination will continue to decrease through natural processes such as dispersion, dilution, and volatilization.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a review will be conducted no less often than once every five years after the start of construction of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for this Site.

- Contaminants of concern and their respective concentrations (see ROD, pages 5-9);

- Baseline human health and ecological risks are represented by the contaminants of concern (see ROD, pages 10-16);

- Cleanup levels established for contaminants of concern and the basis for these levels (see ROD, Appendix II, Table 14);

- Current and reasonably-anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (see ROD, pages 9-10);

- Manner of addressing source materials constituting principal threats (see ROD, page 27);

- Key factors used in selecting the remedy (*i.e.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision)(see ROD, pages 27-28).

- Estimated capital, annual operation and maintenance, and present-worth costs; discount rate; and the number of years over which the remedy cost estimates are projected (see ROD, page 29); and
- Potential land and groundwater use that will be available at the Site as a result of the selected remedy (see ROD, page 30).

AUTHORIZING SIGNATURE

George Pavlou, Director
Emergency and Remedial Response Division

9/30/05
Date

RECORD OF DECISION FACT SHEET
EPA REGION II

Site

Site name:	Peter Cooper Landfill Site
Site location:	Gowanda, Cattaraugus County, New York
HRS score:	30.0
Listed on the NPL:	April 6, 1998

Record of Decision

Date signed:	September 30, 2005
Selected remedy:	Excavation, consolidation and containment of soils with a NYCRR Part 360-equivalent design barrier cap, collection of leachate seep, discharge of leachate to the Village of Gowanda treatment facility, installation of a groundwater diversion system, and institutional controls.
Capital cost:	\$2,164,000-\$2,734,000
Operation and maintenance cost:	\$31,000-\$88,000
Present-worth cost:	\$2,680,000-\$4,080,000
Lead	Potential Responsible Parties (PRPs)
Primary contact:	Sherrel Henry, Remedial Project Manager, (212) 637-4273
Secondary contact:	Kevin Lynch, Chief, Western New York Remediation Section, (212) 637-4287
Main PRPs	Wilhelm Enterprises Corporation, New York State Electric & Gas Corporation, Brown Shoe Company, Inc., GST Automotive Leather, Prime Tanning Company, Seton Leather, and Viad Corp.

Waste

Waste type:	Arsenic, chromium, zinc, chloroform, and carbontetrachloride
Waste origin:	Waste from on-site manufacturing of animal glue and synthetic industrial adhesives
Contaminated media:	Soil and groundwater

DECISION SUMMARY

Peter Cooper Landfill Superfund Site
Gowanda, Cattaraugus County, New York

United States Environmental Protection Agency
Region II
New York, New York
September 2005

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SITE NAME, LOCATION, AND DESCRIPTION

The Peter Cooper Landfill Site (the Site) consists of an inactive landfill area and land associated with the former Peter Cooper Corporation (PCC) glue-manufacturing plant. The Site is located in the Village of Gowanda, Cattaraugus County, New York approximately 30 miles south of Buffalo, New York. The Site is bounded to the north by Cattaraugus Creek, to the south by Palmer Street, to the west by a former hydroelectric dam and wetland area, and to the east by residential properties.

For purposes of the Remedial Investigation and Feasibility Study (RI/FS), the Site was divided into two sections. The western section of the Site, called the Inactive Landfill Area (ILA), is approximately 15.6 acres in size. A subarea within the ILA, approximately 5 acres in size and located in the northwest corner of the Site, is referred to as the Elevated Fill Subarea. The western portion of the Elevated Fill Subarea is located on property owned by the New York State Electric & Gas Corporation (NYSEG) and the remainder of the Elevated Fill Subarea, as well as the remaining areas of the Site, are on property previously owned by PCC, and currently owned by JimCar Development, Inc. The Former Manufacturing Plant Area (FMPA) is located on the eastern side of the Site and measures approximately 10.4 acres.

Regionally, the Village of Gowanda is located both in Erie County and Cattaraugus County and is separated by Cattaraugus Creek. In Erie County, the Village of Gowanda is included in the Town of Collins. The Town of Collins is bordered by the Seneca Nation of Indians Cattaraugus Reservation to the west. In Cattaraugus County, the Village of Gowanda is located in the Town of Persia.

Figure 1 shows the Site area.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Site was previously used to manufacture glue and industrial adhesives. PCC and its predecessor, Eastern Tanners Glue Company, manufactured animal glue in Gowanda from 1904 until 1972. When the animal glue product line was terminated, PCC continued to produce synthetic industrial adhesives until the plant closed in 1985. The wastes from PCC's glue production were disposed of on the Elevated Fill Subarea. Between 1925 and October 1970, PCC used the northwest portion of the property to pile sludge remaining after the animal glue manufacturing process. These wastes, known as "cookhouse sludge" because of a cooking cycle that occurred just prior to extraction of the glue, are derived primarily from chrome-tanned hides obtained from tanneries. The waste material has been shown to contain elevated levels of chromium, arsenic, zinc, and several organic compounds. Observation of the cook-house sludge material during the RI indicated that the sludge appeared to be mixed with cinders, ash, and construction and demolition debris.

In June 1971, the New York State Supreme Court (8th J.D. Cattaraugus County) ordered PCC to remove the waste pile and terminate discharges to Cattaraugus Creek. In 1972, PCC reportedly removed approximately 38,600 tons of waste pile material and transferred it to a separate site in Markhams, New York. Between 1972 and 1975, the remaining waste pile at the Site was graded by

PCC, covered with a 6-inch clay barrier layer and 18-30 inches of soil and vegetated with grass. Stone rip-rap and concrete blocks were placed along the bank of the Creek to protect the fill material from scouring or falling into the Creek.

NYSDEC conducted preliminary site investigations in 1981 and 1983 and identified the presence of arsenic, chromium and zinc in soil and sediment samples. The results of these investigations are available in Appendices B-1 and B-2 of the 2003 RI. As a result of this investigation, NYSDEC oversaw PCC's conduct of an RI/FS for the site. PCC hired O'Brien and Gere Engineers, Inc. (OBG) to perform the RI/FS. The OBG investigation was limited to the ILA. Activities performed during the RI included collection of soil, surface water, sediments, waste material, seep and groundwater samples. The RI Report was issued in January 1989 and the results of this analysis are available in Appendix B-3 of the 2003 RI. The FS Report was submitted to NYSDEC in March 1991 and included recommendations for containment of source materials, leachate collection, access restriction through the building of a fence and deed restrictions. However, because the waste at the Site did not meet the statutory definition in effect in 1991 in New York State for an inactive hazardous waste disposal site, NYSDEC did not select a remedy for the Site and a remedy was not implemented.

In 1996, the EPA Superfund Technical and Assessment Response Team (START) collected and analyzed soil, groundwater and surface water and sediment samples from the Site. Results confirmed contamination, including the presence of arsenic, chromium and other hazardous substances from the Site.

During the site assessments, EPA personnel observed that the existing retaining wall was subject to severe erosion. It was determined that the retaining wall and rip-rap had to be repaired or upgraded to prevent the continued erosion of landfill materials into Cattaraugus Creek.

On October 24, 1996, EPA and NYSEG entered into an Administrative Order on Consent (AOC). Pursuant to the AOC, NYSEG installed approximately 150 feet of rip-rap revetment along the south bank of the Cattaraugus Creek and adjacent to the landfill to prevent further erosion of materials from the landfill into the Creek.

Based on the above information, the Site was added to the EPA's list of hazardous substance sites known as the Superfund National Priorities List (NPL) on April 6, 1998.

EPA's negotiations with the Potentially Responsible Parties (PRPs) for their conduct of the RI/FS were unsuccessful. On March 30, 2000, EPA issued a Unilateral Administrative Order (UAO) to fourteen PRPs directing that they complete the RI/FS for the Site. The UAO became effective May 1, 2000. The RI/FS was performed by Benchmark Environmental Engineering and Science, PLLC and Geomatrix Consultants, Inc, consultants for the PRPs, subject to EPA oversight.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS Reports, Proposed Plan and supporting documents were made available to the public in both the Administrative Record and information repositories maintained at the EPA Docket Room in the Region 2 offices at 290 Broadway in Manhattan, at the Village of Gowanda Free Library, located at 56 W. Main Street, Gowanda, New York and the Seneca Nation of Indians Library, located at 3 Thomas Indian School Drive, Irving, New York. The Proposed Plan was prepared by EPA, with concurrence by NYSDEC, and finalized in July 2005. A notice of the Proposed Plan and commencement of the public comment period, the public meeting date, contact information, and the availability of the above-referenced documents was published in the *Dunkirk Observer* and the *Penny Saver* on July 30, 2005, consistent with the requirements of NCP §300.430(f)(3)(i)(A), and a copy of the Proposed Plan was mailed to all persons on the Site mailing list. The public notice established a thirty-day comment period from July 30, 2005 to August 28, 2005. An extension to the public comment period was requested. As a result, the comment period was extended to September 26, 2005.

EPA held a public meeting on August 10, 2005 at 7:00 P.M. at the Gowanda Central High School, 24 Prospect Street, Gowanda, New York, to present the findings of the RI/FS and to answer questions from the public about the Site and the remedial alternatives under consideration. Approximately 50 people, including residents, local business people, and state and local government officials, attended the public meeting. Responses to the written comments received during the public comment period and to comments received at the public meeting are included in the Responsiveness Summary (see Appendix IV).

EPA's 1984 Indian Policy recognizes the government-to-government relationship between EPA and the Nations, as one sovereign to another. EPA has committed to communicate with Nation governments before making decisions on environmental matters affecting Nation governments and/or Nation natural resources. To this end, copies of all documents generated as part of the RI/FS, including the RI and FS reports were submitted to the Seneca Nation of Indians for review and comment. In addition, on August 10, 2005, EPA met and discussed the preferred remedy and the basis for this preference with the Seneca Nation Environmental Protection Department representatives.

SCOPE AND ROLE OF RESPONSE ACTION

Cleanup at the Site is currently being addressed as one operable unit (OU). As noted above, to date, the following removal action has occurred at the Site:

- Installation of approximately 150 feet of rip-rap revetment along the south bank of the Cattaraugus Creek and adjacent to the landfill to prevent further erosion of materials from the landfill into the Cattaraugus Creek.

This ROD describes the comprehensive long-term remediation plan for the entire Site and is expected to be the only ROD issued for the Site. The primary objectives of this action are to remediate the sources of contamination at the Site, reduce and minimize the downward migration of contaminants to the groundwater, control landfill gas and minimize any potential future health and environmental impacts.

SUMMARY OF SITE CHARACTERISTICS

Chemical and physical data were collected to determine the nature and extent of contamination associated with the Site. Media sampled during the RI included landfill gas, groundwater, surface water, sediment, soil, waste material, and seepage emanating from the landfill. All field activities were conducted with oversight by EPA's contractor, CDM Federal Programs Corporation (CDM) and its subcontractor, TAMs Consultants, Inc., now known as Earth Tech. The RI was structured to supplement past investigations with the goal of using historical data, as well as new data collected during the RI, to evaluate current and future human health and ecological risks and develop a recommended remedial approach. The constituent concentrations detected during this RI are generally consistent with the data from the 1989 RI. The results of the RI are summarized below.

A. Geology and Hydrology

The Site is located on the southern bank of the Cattaraugus Creek. The ILA slopes on the northern side toward the edge of the Creek. The Site including the ILA and FMPA is underlain by shale bedrock of the Canadaway Formation. Shale outcrops are present in and along Cattaraugus Creek, across the northern site perimeter, and the hill slope south of Palmer Street. The elevation of the bedrock surface generally slopes in a northwesterly direction, toward the Creek. The depth to the top of the bedrock across the Site ranges from 4.5 feet to 25.4 feet. The 5-acre Elevated Fill Subarea which is located in the ILA consists of materials that appear to have been placed within an excavated area that is approximately five to 13 feet thick. Both the alluvial soil and the fill materials comprise the overburden at the Site. The fill material is characterized as cindery fill and sludge fill. The thickness of the sludge fill ranges from five to 23 feet. The sludge fill appears to extend down to the weathered bedrock surface near the Creek side of the Site.

The overburden and upper bedrock water bearing zones were investigated. Ground water from both zones discharges to Cattaraugus Creek. Groundwater elevation data indicate that the depth to groundwater varies across the Site from approximately five feet to 20 feet. This variability is largely due to topographic changes across the Site. Groundwater in the overburden generally flows toward the north/northwest, discharging into Cattaraugus Creek. The landfill creates a small mounding effect on the groundwater surface. Based on groundwater elevation data collected from the overburden, there is a horizontal hydraulic groundwater flow toward Cattaraugus Creek and a downward hydraulic potential into the upper bedrock. A localized westerly flow direction occurs in the overburden near the Elevated Fill Subarea. Groundwater flow in the bedrock is primarily along fractures and joint and bedding planes which tend to be strongly horizontally oriented toward the Creek. Although the groundwater in the area is classified as a potable water supply by NYSDEC, residents obtain their water from public water supplies that are monitored to ensure they meet appropriate federal and state regulations. Groundwater contour maps for the overburden and bedrock are provided in Figures 2 through 5.

The nearest surface water body associated with the Site is Cattaraugus Creek. The Cattaraugus Creek is suitable for fishing and secondary recreation (not primary contact recreation such as swimming) but not as a drinking water supply. In the vicinity of the Site, the Creek meanders through an incised bedrock valley cut by thousands of years of stream flow. The creek channel width is 130 feet and of variable depth in the area forming the northern Site property boundary. The drainage area of the Creek is approximately 436 square miles and measures 70 miles in length and flows in a westerly direction eventually discharging into Lake Erie.

B. Sensitive Environments

Three federal wetland communities were delineated within the boundaries of the Site. An approximately 0.25-acre wetland area, characterized as a combination forested/ scrub-shrub wetland, was identified at the northeastern limit of the Site. A 36-inch municipal storm water outfall pipe discharges into the southern portion of this wetland. The second wetland is an emergent wetland, located in a depression along the southern side of the Elevated Fill Subarea, that measures less than 1,200 square feet. The other wetland is a scrub-shrub wetland, located in the center portion of the Site, that measures approximately 3,000 square feet. This scrub-shrub wetland appears to have been created as a result of storm water drainage at the Site. A 12-inch storm water outfall discharges to the Site at the southern end of this scrub-shrub wetland. The thickness of the wetland sediments was found to be greater than five feet deep.

The 100-year and 500-year floodplain areas are located at varying distances and elevations from the banks of Cattaraugus Creek and are positioned along the entire length of the Creek. The 100-year flood elevation is approximately 768 feet mean sea level.

No State or Federal-designated endangered species of plants or animals are known to exist at the Site.

C. Chemical Characteristics

Groundwater

Groundwater samples were collected for chemical analysis from the overburden and upper bedrock groundwater in both the ILA and the FMPA. Chemical data for groundwater samples collected prior to the RI can be found in Appendix B of the RI report. Groundwater data and sampling locations may be found in Tables 1 through 4 and Figures 6 and 7, respectively.

Groundwater samples in the ILA indicate the presence of volatile organic compounds (VOCs) and metals at levels above applicable New York State groundwater quality standards in both the overburden and bedrock aquifers. Of the 16 overburden well samples (two rounds of samples from eight wells), four contained VOCs, including benzene, chlorobenzene, 1,2-dichlorobenzene, and toluene above groundwater standards. Benzene was detected at a maximum concentration of 1.6 micrograms/liter (ug/L), slightly above the groundwater criteria of 1 ug/L. The compound detected at the highest concentration was chlorobenzene at 190 ug/L, followed by toluene (17 ug/L). The groundwater criteria for both compounds is 5 ug/L. 1,2-dichlorobenzene was detected in one sample at a concentration of 5 ug/L, which is above the groundwater criteria of 3 ug/L. Metals, including arsenic, at a maximum concentration of 196 ug/L and chromium, at a maximum concentration of 436 ug/L, were detected above groundwater quality standards of 25 ug/L and 50 ug/L, respectively. In addition, elevated concentrations of leachate parameters (e.g., dissolved solids, chloride, ammonia, alkalinity, and hardness) indicated that groundwater is being impacted by leachate from the Elevated Fill Subarea.

Of the 14 upper bedrock groundwater samples (two rounds from seven wells) analyzed from the ILA for VOCs and semi-volatile organic compounds (SVOCs), only one chemical, chlorobenzene, exceeded groundwater criteria. The result was 6.8 ug/L, slightly above the groundwater criteria of 5 ug/L. Metals in the overburden aquifer were generally also found in the bedrock aquifer, but at lower concentrations slightly above the applicable groundwater standards.

Information from monitoring wells and soil borings indicates that a portion of the waste sludge in the inactive landfill is below the groundwater table. There are no natural barriers (clay layers) between the waste and the bedrock aquifer, to retard the migration of waste constituents to the bedrock aquifer. Groundwater in both the overburden and bedrock flows toward Cattaraugus Creek.

Groundwater samples in the overburden wells in the FMPA showed only one VOC, tetrachloroethene, detected at 5.5 ug/L, slightly above the groundwater criteria of 5 ug/L. No SVOCs were detected above the groundwater criteria. Metals including iron, manganese and sodium were detected above groundwater criteria.

Chemical data for six bedrock groundwater samples (two rounds from three wells) from the FMPA showed concentrations of VOCs and metals slightly above groundwater criteria. VOCs included acetone, benzene, cis-1,2-dichloroethene, m/p-xylene and toluene. SVOCs were not detected above groundwater criteria. The same metals detected in the overburden well were also detected in the bedrock wells at similar concentrations.

Seeps

Six samples were taken from three groundwater leachate seeps which emanate from the Elevated Fill Subarea on the bank of Cattaraugus Creek and flow into the Creek. Seeps were sampled in order to determine if contaminants in the seeps are entering surface water. Contaminants in seeps were compared to surface water standards and criteria in Table 5. Ammonia and sulfur-like odors have been frequently noted near the seeps. Ammonia concentrations ranged from 381 to 891 milligrams per liter (mg/l) and exceeded the surface water quality criterion of 1.3 mg/l. Sulfide concentrations ranged between less than 1 and 9 mg/l and exceeded the New York State surface water quality criterion of 2 mg/l. No VOCs or SVOCs were detected above surface water criteria in any of the samples taken from the seeps.

Chromium was found in all but one of the seep samples, at levels exceeding surface water standards. The detection of elevated levels of ammonia and sulfide in the seep samples, is consistent with reports of odors noted near the seeps.

Surface Water

Surface water samples were collected from Cattaraugus Creek adjacent to the Site to characterize contamination in the creek. Surface water sample locations are shown on Figure 8. Sample results were compared to New York State surface water quality criteria. One sample marginally exceeded the surface water quality criteria for ammonia. The water quality criterion for iron was exceeded in surface water samples at locations both upstream and downstream of the landfill; these levels do not appear to be attributable to the landfill. Sulfide, which was detected in seeps from the ILA at concentrations above guidance values, was not detected above guidance values in Cattaraugus Creek. In addition, discoloration from leachate seeps was observed on the banks of the Creek in contravention of the criteria outlined in 6 NYCRR Part 703.

Sediment Samples

Sediment samples were collected from Cattaraugus Creek and the wetland adjacent to the Site. Sediment sample locations are shown on Figure 8. Sediment in the Creek is sparse because of the high velocity stream flow and the shale bedrock that forms the side walls and stream beds of the Creek. Sample data were compared to New York State sediment quality criteria and guidance values.

Arsenic was detected above the sediment quality criterion of 6 milligrams per kilogram (mg/kg) in Cattaraugus Creek sediment at a maximum concentration of 9.61 mg/kg. One sample result for nickel of 18.2 mg/kg exceeded the sediment quality criteria (16 mg/kg). VOCs and SVOCs were not detected in sediment samples from Cattaraugus Creek.

Sediment samples collected in the wetland area adjacent to the Site exceeded sediment quality criteria and guidance values for arsenic, chromium, and zinc. Arsenic levels of 16.3 mg/kg exceeded the New York State sediment quality criterion (12 mg/kg) in all of the wetland sediment samples. The maximum chromium concentration of 55.3 mg/kg exceeded the sediment quality criterion (40 mg/kg). The maximum concentration of zinc of 290 mg/kg exceeded the sediment quality criterion (50 mg/kg). In addition to metals, a number of VOCs including benzene, toluene, ethylbenzene, and xylenes were detected at low concentrations in all of the sediment samples. (Results are discussed in Ecological Risk Assessment section).

Soils

Chemical data were collected from 30 surface and 23 subsurface soil samples from both the ILA and the FMPA. Soil results and sampling locations may be found in Tables 6 through 8, and Figures 9 through 11, respectively. There are currently no federal or state promulgated standards for contaminant levels in soils. In the absence of Applicable and Relevant or Appropriate Requirements (ARARs), "To Be Considered" (TBCs) values from the New York State Technical and

Administrative Guidance Memorandum (TAGM)[1] were used.

Metal concentrations were compared to the TAGM values. Three metals, arsenic, chromium and zinc, were detected above TAGM values in both surface and subsurface soils in the ILA. No VOCs were detected at or above the guidance values.

In surface soils at the ILA, arsenic was detected at six locations above the TAGM objective (12 mg/kg) at a maximum concentration of 919 mg/kg in sample LFSS-6. The area around sample LFSS-6 was identified as a hot spot. Chromium was detected at nine locations above TAGM values (50 mg/kg) at a maximum concentration of 550 mg/kg. Zinc was detected at 19 of the locations sampled above TAGM values (50 mg/kg) at a maximum concentration of 165 mg/kg. In subsurface soil samples collected in the ILA, arsenic, chromium and zinc were detected at maximum concentrations of 60.5 mg/kg, 623 mg/kg and 1,390 mg/kg, respectively. Except for the high arsenic value, the concentrations of the compounds detected during this RI are generally consistent with the data from the 1989 RI.

Surface soil samples collected from the FMPA indicated the presence of three VOCs above guidance values in one location, near MWFP-3S/D. At this location, three compounds, chloroform, carbon tetrachloride and tetrachloroethene, were detected at maximum concentrations of 5.7 mg/kg, 10 mg/kg and 54 mg/kg, respectively. The TAGM value for chloroform, carbon tetrachloride and tetrachloroethene are 0.3 mg/kg, 0.6 mg/kg and 1.4 mg/kg, respectively. The presence of these VOCs in soil near MWFP-3S/D was further investigated to determine the areal extent of the contamination. The results of the investigation indicated a hot-spot area of approximately 20 feet by 40 feet by 4 feet that contains VOC contamination.

Metal concentrations also exceeded guidance values at nine locations sampled. The concentrations of arsenic, chromium, copper, mercury, lead and zinc exceeded their respective TAGM values. Arsenic was detected at five locations above the TAGM value at a maximum concentration of 168 mg/kg in sample SB-2. The area around sample SB-2 was identified as a hot spot. Chromium was detected at five locations above TAGM value (50 mg/kg) at a maximum concentration of 198 mg/kg. Copper was detected at three locations above TAGM value (50 mg/kg) at a maximum concentration of 177 mg/kg. Mercury was detected at three locations above TAGM value (0.2 mg/kg) at a maximum concentration of 3.1 mg/kg. Lead was detected at six locations above TAGM value (61 mg/kg) at a maximum concentration of 269 mg/kg. Zinc was detected at nine locations above TAGM value (50 mg/kg) at a maximum concentration of 1,390 mg/kg. Subsurface soil samples were collected from 12 soil boring locations.

A total of 12 subsurface soil samples was collected from the FMPA. No VOCs were detected above the guidance values. Metals (arsenic, chromium, copper, mercury and zinc) in several FMPA samples were also detected above their respective TAGM values.

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[1] Division Technical and Administrative *Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, Division of Hazardous Waste Remediation, January 24, 1994.*

Waste Material (Sludge Fill)

Chemical analytical results of the sludge fill present in the ILA are based on three samples (GMW-1 through GMW-3) that were analyzed for VOCs and one composite sample that was analyzed for SVOCs and metals. There are no sludge fill criteria values available for comparison. Samples of the sludge fill contained concentrations of some VOCs. The VOCs detected at the highest concentrations are as follows: acetone, 15 mg/kg; 2-butanone, 3.2 mg/kg; and toluene, 1.7 mg/kg. The following 12 VOCs were also detected at concentrations of less than 1 mg/kg: 1,1-dichloroethane, 1,2-dichloroethane, 2-hexanone, 4-methyl-2-pentanone, benzene, carbon disulfide, chlorobenzene, ethylbenzene, xylenes, methycyclohexane, styrene and tetrachloroethene. SVOCs and metals were detected in the composite sample. The SVOCs and the concentrations at which they were detected are as follows: 4-methylphenol, 150 mg/kg; naphthalene, 22 mg/kg; phenol, 15 mg/kg; pentachlorophenol, 6.8 mg/kg; and phenanthrene, 1 mg/kg. The metals arsenic, chromium and zinc were detected at concentrations of 34.8 mg/kg, 9,280 mg/kg and 6,060 mg/kg, respectively. The sludge fill material also contained 10 percent total organic carbon.

Landfill Gas

Landfill gas samples were collected from three gas monitoring wells and analysis found several volatile organic compounds (VOCs) including acetone, 2- butanone, benzene, carbon disulfide, toluene, ethylbenzene, and xylenes. Several gases associated with the decomposition of organic matter in the landfill were detected including hydrogen sulfide, carbon monoxide, carbon dioxide, and methane.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The Site is located in an area characterized by mixed industrial-commercial/residential usage. Residential zoning is the dominant parcel designation within the Village. Industrialized zones are primarily concentrated in the southeast portion of the Village, primarily along Cattaraugus Creek. The site is located in an area zoned industrial.

Regional groundwater is a sole source of potable water and is designated as a drinking water source by NYSDEC. Industries, businesses, and residences obtain their drinking water from the Village of Gowanda municipal water supply.

In determining future land uses for the site, EPA considered the "Reuse Assessment and Conceptual Plan for the Peter Cooper Gowanda Superfund Site" (Reuse Assessment and Concept Plan) developed by the Village of Gowanda in association with the University of Buffalo Center for Integrated Waste Management. The Reuse Assessment and Concept Plan was funded in part by EPA through its Superfund Redevelopment Initiative. The plan envisions a publicly available Site incorporating elements such as a walking/biking trail, fishing access, outdoor picnic areas, small boat launch and other related recreational features.

SUMMARY OF SITE RISKS

A baseline human health risk assessment (BHHRA) was conducted for the ILA and the FMPA of the Peter Cooper Landfill site. The BHHRA is available in "Baseline Risk Assessment" prepared by Geomatrix Consultants, Inc. and Benchmark Environmental Engineering and Science, PLLC, dated November 2003.

The BHHRA considered the Reuse Assessment and Conceptual Plan for the Peter Cooper Gowanda Superfund Site (Reuse Assessment and Concept Plan), described above. The BHHRA evaluated the potential future land uses for both the ILA and FMPA described in the Plan.

A Screening Level Ecological Risk Assessment (SLERA) was also prepared to evaluate the potential risks to ecological receptors from contaminants in soils, surface water, landfill seeps, and sediment at the ILA and the FMPA. The SLERA titled "Screening Level Ecological Risk Assessment" was developed by Geomatrix Consultants, Inc. and Benchmark Environmental Engineering and Science, PLLC, dated November 2003. EPA evaluated potential ecological risk for the wetland area, the landfill, and Cattaraugus Creek. The SLERA used analytical data from samples collected during the RI and information on the ecological communities present at the site. The SLERA was prepared in accordance with EPA's *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA 1997).

Human Health Risk Assessment. A Superfund BHHRA is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these conditions under current and future land uses. The BHHRA was developed consistent with appropriate Agency guidelines, guidance and policies including specific Superfund guidance.

The BHHRA evaluated risks from exposure to chemical contaminants at the ILA and FMPA. The potential receptors evaluated in the BHHRA, based upon on- and off-site land use, are discussed below.

- Current Land Use: Adult and adolescent trespassers at the ILA and FMPA.

- Recreational Future Land Use. Adult, adolescent and child recreational users based on potential open-space recreational use of the former ILA and FMPA.

- Commercial/Industrial Future Land Use. Adult park, industrial and construction workers at the ILA and FMPA. Commercial workers at the FMPA.

- Future Off-Site Receptors. Future off-site receptors include people residing or working downwind of the site including recreational users located downstream of the Site on

Cattaraugus Creek. Members of the Seneca Nation who reside on the Cattaraugus reservation located approximately one-mile downstream of the site were also identified as potential receptors through ingestion of fish.

The results of the BHHRA found the cancer risks and non-cancer health hazards for the RME individual associated with exposures to the future ILA park worker and FMPA industrial worker exceeded the risk range. Ingestion of groundwater by these receptors exceeded the cancer risk range of 10^{-4} (one in ten thousand) to 10^{-6} (one in a million) and a non-cancer Hazard Index (HI) of 1 identified in the NCP. The BHHRA also found non-cancer health hazard of approximately an HI = 2 for the future construction worker on the ILA.

All other pathways evaluated were within or below the risk range of 10^{-4} (one in ten thousand) to 10^{-6} (one in a million) or an HI of 1 for individual health effects with a few exceptions. The exceptions are described in the Updates to the 2003 BHHRA section below.

Updates to 2003 BHHRA. At the request of NYSDEC, EPA conducted additional statistical analyses of the concentrations of arsenic in soil at the FMPA area. This analysis found a statistical outlier or hotspot area with a concentration of 168 mg/kg arsenic. All other concentrations in this area were below 30 mg/kg. The HI to the construction worker in this area is approximately 1.4.

At the current time, EPA is conducting a reassessment of the inhalation chemical toxicity of chloroform and carbon tetrachloride through the Integrated Risk Information System process (www.epa.gov/iris). IRIS provides the Agency's consensus toxicity values for over 500 chemicals. Based on this reassessment activity, the inhalation non-cancer toxicity values for chloroform and carbon tetrachloride were withdrawn by EPA's National Center for Environmental Assessment (NCEA). In the absence of these toxicity values, the non-cancer pathways of exposure from these chemicals (e.g., inhalation) can not be quantitatively evaluated. However, the cancer toxicity information for each chemical is currently available on IRIS and remains appropriate to use.

In the absence of the quantification of inhalation toxicity for carbon tetrachloride and chloroform, the BHHRA did identify potential cancer risks for the future commercial worker from exposures to these chemicals and other volatile organic chemicals of approximately 3×10^{-5} (3 in 100,000). The main chemicals contributing to the excess cancer risks were carbon tetrachloride and chloroform. As described above, risk from exposure to arsenic in groundwater under the FMPA also exceeded the risk range. Consistent with EPA's Directive on the Role of the Baseline Risk Assessment (OSWER DIRECTIVE 9355.0-30, dated April 22, 1991 and available at www.epa.gov/oswer/riskassessment/pdf/baseline.pdf): "... once a decision has been made to take an action, the Agency has expressed a preference for cleanups achieving the more protective end of the range (i.e., 10^{-6})." The cancer risks from inhalation of carbon tetrachloride and chloroform exceed EPA's goals of protection of 10^{-6}. The lack of non-cancer toxicity values for these chemicals is an area of uncertainty that will be addressed once the IRIS reassessments are completed.

As stated in the FS (page 23), "... Groundwater at MWFP-3 was also impacted by VOCs, indicating localized leaching of organic constituents from impacted soil/fill." The FS further states: "To reduce construction worker risks to within acceptable levels and provide a concurrent environmental benefit of protecting Cattaraugus Creek from possible VOC loadings via migration from MWFP-3 subarea soils to groundwater cleanup goals were set equivalent to NYSDEC TAGM HWR-94-4046 Recommended Soil Cleanup Objectives (RSCOs)." In the absence of non-cancer toxicity values, the concentrations found in the soil were compared to the NYS TAGMs of 0.6 mg/kg for carbon tetrachloride and 0.3 mg/kg for chloroform and were found to exceed these values. The preliminary remediation goals for industrial soil at a risk level of 10^{-6} for these chemicals are comparable to the TAGMs at 0.55 mg/kg for carbon tetrachloride and 0.47 mg/kg for chloroform.

Risk Assessment Process. A four-step process is utilized for assessing quantitative human health risks for reasonable maximum exposure (RME) scenarios. The methodology is presented below:

Data Collection and Analysis: In this step, the contaminants of potential concern (COPCs) in groundwater, soil, air, etc. are identified based on such factors as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation. Table 9 (groundwater and soil) identifies the COPCs by media and location. As described previously, one hot spot location for arsenic in soil was identified in the FMPA. In addition a second hot spot in the FMPA was identified for chloroform and carbon tetrachloride.

Exposure Assessment: The different exposure pathways through which people might be exposed to the contaminants identified in the data collection and analysis are evaluated in this step. A description of the various pathways and receptors evaluated that did not pose an unacceptable risk were identified above.

The Exposure Point Concentrations for groundwater and soil were calculated using a 95% Upper Confidence Limit on the Mean where adequate data were available to support the statistical calculation. Where adequate statistical information was not available, the maximum concentration was used. ProUCL Version 3.0 software was used to perform the statistical calculations. Table 9 (soil and groundwater) provides the EPCs for the COPCs posing unacceptable risk. Two arsenic hot spot areas were identified, one in the ILA at a concentration of 919 mg/kg and the other in the FMPA with a concentration of 168 mg/kg.

Using default exposure factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated. This exposure assessment evaluated current/future land uses including children and adults who may consume groundwater or ingest soil from the FMPA and ILA. Table 10 and 11 summarize cancer risks and non-cancer health hazards exceeding the risk range for receptors at the ILA and FMPA.

Standard default exposure assumptions were used in the calculations for the adult workers on-site cancer risks and non-cancer health hazards (Table 10 and 11, respectively).

Professional judgment was used in developing exposure frequency and duration assumptions for trespassing and recreational users of the FMPA and ILA and this was combined with default values where available.

Dose-Response: Current toxicity factors from the IRIS database, EPA's consensus toxicity database were used in the calculations of cancer risks and non-cancer health hazards. This toxicity data is summarized in Tables 12 and 13 for both cancer and non-cancer health effects. The non-cancer toxicity values for chloroform and carbon tetrachloride are no longer supported by NCEA while EPA evaluates these chemicals through the IRIS program.

Risk Characterization: This step summarizes and combines exposure information and toxicity data to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for exposures are an individual lifetime excess cancer risk in the range of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk). For non-cancer health effects, a "hazard index" (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding Reference Dose (RfD). The key concept for a non-cancer HI is that a "threshold level" (measured as an HI of less than 1) exists below which non-cancer health effects are not expected to occur. A calculated HI of greater than 1 does not predict a specific disease.

For human health, risks from chemical exposure were estimated for current and future RME individuals at the ILA and FMPA. Specifically, human cancer risks associated with exposure to the COPCs were evaluated.

- Future outdoor park workers at the landfill area had cancer risks of 4 x 10^{-4} (four in 10,000) and an HI = 2.2. The cancer risks exceed the risk range. The risk is primarily attributed to the ingestion of groundwater contaminated with arsenic underlying the Site (Tables 10 and 11).

- Future industrial workers at the FMPA had cancer risks of 4 x 10^{-4} (four in 10,000). Both the cancer risks and non-cancer HI (2) exceed acceptable levels. The risk is primarily due to ingestion of arsenic in groundwater. A separate statistical analysis of the arsenic soil data found a hotspot area where the concentration in area SB-2 of the FMPA of 168 mg/kg exceeded the goal of protection of 10^{-6} for future construction workers and had an HI = 1.4.

- Potential cancer risks for the future commercial worker at the FMPA from exposures to carbon tetrachloride and chloroform and other volatile organic chemicals were approximately 3 x 10^{-5} (3 in 100,000) (Table 10) and, for non-cancer health effects, an HI = 2.5 with arsenic in groundwater the primary risk. As described above, the lack of non-cancer toxicity values prevents further quantification of the non-cancer HI with respect to chloroform and carbon tetrachloride. As discussed above, based on the uncertainties associated with this exposure pathway and consistent with the OSWER Directive regarding the role of the baseline risk assessment, once an action is deemed to be necessary at a Site, the preference is to achieve the more protective level of the risk range and a 3×10^{-5} (3 in 100,000) risk does not achieve the goal of protection.

- Potential non-cancer health hazards to the future construction workers at the ILA were 1.8 with arsenic as the main contributor to the non-cancer health hazards.

Discussion of Uncertainties in Risk Assessment

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, include uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis;
- environmental parameter measurement;
- fate and transport modeling;
- exposure parameter estimation; and,
- toxicological data.

Uncertainty in environmental sampling arises, in part, from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources, including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the contaminants of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the contaminants of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the baseline human health risk assessment provides upper-bound estimates of the risks to populations near the Site, and it is highly unlikely to underestimate actual risks related to the Site.

Specifically, several aspects of risk estimation contribute uncertainty to the projected risks. Uncertainty associated with sample laboratory analysis and data evaluation is considered low as a result of a quality assurance program which included data validation of each sample result.

In addition to the calculation of exposure point concentrations, several site-specific assumptions regarding future land use scenarios, intake parameters, and exposure pathways are a part of the exposure assessment stage of a baseline risk assessment. Assumptions were based on site-specific conditions to the greatest degree possible, and default parameter values found in EPA risk assessment guidance documents were used in the absence of site-specific data. However, there remains some uncertainty in the prediction of future use scenarios and their associated intake parameters and exposure pathways. The exposure pathways selected for current scenarios were based on the site conceptual model and related data. The uncertainty associated with the selected pathways for these scenarios is low because site conditions support the conceptual model.

Ecological Risk Assessment

A SLERA was prepared to evaluate the potential risks to ecological receptors from contaminants in soils, surface water, landfill seeps, and sediment. EPA evaluated potential ecological risk for a number of areas of the site including the wetland area, the landfill area, and Cattaraugus Creek. The SLERA used analytical data from samples collected during the RI and information on the ecological communities present at the site. The ecological risk assessment was prepared in accordance with EPA's *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA 1997).

The overall conclusions of the SLERA are summarized below:

The SLERA indicates no potential ecological risks from organic contaminants to receptor species including fish, terrestrial plants, wetland plants, benthic invertebrates, terrestrial invertebrates, birds, and mink.

With limited exceptions, benthic organisms and fish in Cattaraugus Creek show no potential ecological risks from organic chemicals in creek sediment and surface water. Where potential ecological risks to benthic organisms and fish from inorganic chemicals in creek sediment and surface water occur, the associated chemical was present in upstream samples at similar concentrations to downstream samples. This suggests that the Site is not a significant contributor to the ecological risk.

The SLERA indicates potential for ecological risk to terrestrial receptors from organic and inorganic contaminants in soils at the Site. The food web model used in the SLERA indicates potential ecological risk from exposure to semivolatile organic compounds in soil, in particular polynuclear aromatic hydrocarbons (PAHs), which are SVOCs, for terrestrial mammalian species. The SLERA also indicates potential risk to terrestrial receptors including terrestrial invertebrates and mammals from one or more inorganic chemicals in soil including arsenic, chromium, lead, and zinc.

Basis for Action

Based upon the results of the RI and the human health and ecological risk assessments, EPA has determined that the response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), TBC guidance, and site-specific risk-based levels, as well as the risks defined in the human health and ecological risk assessments, under the current and reasonably-anticipated future land use.

The following RAOs were established for the Site:

- Reduce or eliminate any direct contact threat associated with the contaminated soils/fill;
- Minimize or eliminate contaminant migration from contaminated soils to the groundwater; and
- Minimize or eliminate contaminant migration from groundwater to Cattaraugus Creek.

Table 14 summarizes cleanup objectives for chemical of potential concerns. Soil cleanup objectives, in the absence of EPA non-cancer toxicity values for chloroform and carbon tetrachloride, will be those established pursuant to the TAGM guidelines. Soil cleanup objectives for arsenic in the hot spot areas are based on potential risks to the construction worker associated with a non-cancer HI of 1. The risk-based level is 120 mg/kg. Groundwater cleanup goals will be the more stringent of the state or federal promulgated standards.

DESCRIPTION OF ALTERNATIVES

CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARS, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4).

Detailed descriptions of the remedial alternatives for addressing the contamination associated with the Site can be found in the FS report. Note that the FS report presented separate alternatives for five of the media associated with the Site (Leachate Seeps, Elevated Fill Subarea, Soils, Elevated Fill Subarea Gas and Groundwater). However, to facilitate the presentation and evaluation of these alternatives, the FS report alternatives were reorganized to formulate the remedial alternatives discussed below.

A number of institutional controls—deed notices, restrictive covenants, environmental easements – were considered to further control human exposure to contaminated groundwater underlying the Site. Residences and business in the vicinity of the Site obtain potable water from the Public Water Supply of the Village of Gowanda.

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the performance of the remedy with any potentially responsible parties, or procure contracts for design and construction. The remedial alternatives are described below.

<u>REMEDIAL ALTERNATIVES</u>

ALTERNATIVE 1: NO ACTION

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with other alternatives. Under this alternative, no action would be taken to contain wastes, reduce infiltration into the landfill, eliminate areas of exposed waste, or control and treat leachate discharging from the landfill or address groundwater. Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site conditions be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated soils.

Capital Cost:	$0
O&M Cost:	$0
Present-worth Cost:	$0
Construction Time:	None

ALTERNATIVE 2: INSTITUTIONAL CONTROLS

This alternative would consist of deed and access restrictions. The deed restrictions would be comprised of restrictive covenants and environmental easements designed to prevent direct contact with the subsurface waste material in the Elevated Fill Subarea and the three hot spot areas by limiting future Site use. The deed restrictions would also be designed to prevent groundwater use on the Site for drinking water or potable purposes. In addition to the institutional controls, access would be restricted by the construction of a fence around the Elevated Fill Subarea where insufficient cover soils and/or vegetative cover exist. Access to the Elevated Fill Subarea by authorized personnel would be through one or more lockable gates. No remedial action would be taken with regard to the leachate seep or landfill gases. To allow subsurface construction in the hot spot area a soils management plan will be required and developed to provide guidance for workers involved in handling of soil/fill from this area (e.g., personal protective equipment requirements during underground utilities construction, methods for disposing of soil/fill removed from excavation, etc.). Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site conditions be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated soils.

Capital Cost:	$ 54,000
Annual O&M Cost:	$ 11,500
Present-worth Cost:	$190,000
Construction Time:	6 months

ALTERNATIVE 3: EXCAVATION/BANK STABILIZATION/OFF-SITE DISPOSAL

This alternative would involve excavation of a total of approximately 140 cubic yards (CY) of VOC-impacted soil (MWFP-3 Subarea) and arsenic-impacted soil (SB-2 Subarea) from the FMPA; 5,800 CY of arsenic-impacted soil/fill (LFSS-6 Subarea) from the ILA; and 100,000 CY of sludge fill material from the Elevated Fill Subarea, with transport of excavated materials to a permitted, off-site disposal facility for treatment and/or disposal. The alternative would require bank stabilization of the Cattaraugus Creek to the 100-yr floodplain elevation after the sludge fill removal is completed. The bank stabilization would extend from the existing concrete retaining wall (sluiceway wall) to the existing riprap stabilization on the NYSEG property. The areas would then be backfilled with clean soil to match the surrounding grade, covered with topsoil, and seeded to promote vegetative growth. On-site dewatering of the sludge fill and/or admixing with drier soils would be required during removal of saturated materials in order to eliminate free liquid. The estimated amount of material requiring disposal is 150,000 tons, assuming admixing was employed at a rate of approximately one ton dry soil to two tons of sludge fill material.

Since the waste would be removed, the Elevated Fill Subarea would no longer be acting as a source of contamination to the groundwater and the Creek. The remaining contaminated groundwater throughout the Site would be cleansed over time by operation of the natural mechanisms of dispersion and dilution. The impact of the groundwater discharge to the creek would also be addressed by the removal of the waste. Because this alternative would result in contaminants remaining in the groundwater above health-based levels, CERCLA requires that the Site conditions be reviewed at least once every five years.

Capital Cost: $12,293,000

No annual cost is associated with this alternative.

Construction Time: 9 -21[2] Months

ALTERNATIVE 4: EXCAVATION/CONSOLIDATION/ CONTAINMENT/WITH SOIL ENHANCEMENT CAP AND A GROUNDWATER DIVERSION SYSTEM

This alternative would include the deed restrictions described in Alternative 2 above with the addition of the following remedial measures:

Excavation of approximately 140 cubic yards (CY) of VOC-impacted soil (MWFP-3 Subarea) and arsenic-impacted soil (SB-2 Subarea) from the FMPA; and 5,800 CY of arsenic-impacted soil/fill from the ILA (LFSS-6 Subarea), and consolidation of the excavated materials within the Elevated Fill Subarea. Confirmation sampling of the sidewalls and bottom of the excavation would be performed to verify that no residual soil/fill containing VOCs or arsenic above guidance levels remains. The area would then be backfilled with clean soil and seeded to promote vegetative growth.

Containing the waste by placing a minimum of 12 inches of low permeability ($<1 \times 10^{-5}$ cm/sec) soil across the entire 5-acre Elevated Fill Subarea (this will result in a soil cap of varying depth between 12 inches [in those areas where the cap has been eroded and wastes currently are exposed] and 57 inches [across most of the Elevated Fill Subarea where existing soil cover is already present at varying thicknesses up to 45 inches]). The soil cap would then be covered with top soil and seeded to promote vegetative growth; and

Limiting groundwater migration through the Elevated Fill Subarea via an upgradient groundwater diversion system. Typical groundwater subsurface lateral barriers such as slurry walls, compacted clay walls, grouting and sheet piling are often implemented in conjunction with a cover system and groundwater/leachate collection to reduce lateral contaminant migration. The upgradient groundwater diversion system would employ a slurry wall keyed into the upper 1-2 feet of soft shale bedrock. The slurry wall would be constructed upgradient of the perimeter of the Elevated Fill Subarea, extending from the remnants of the former hydroelectric dam on the creek bank to the southwestern site boundary. The natural mechanisms of dispersion and dilution would be relied upon to reduce the contamination of groundwater throughout the Site.

[2] Nine months if work is completed in a single construction season, 21 months if a second construction season is required.

Reviewing site conditions at least once every five years as per CERCLA, because this alternative would result in contaminants remaining on-site above health-based levels; and

Selecting one of two leachate seep collection options described below.

Option A — <u>Bank Stabilization, Collection of Leachate Seep and discharge to the Public Owned Treatment Works (POTW) for Treatment and Disposal</u>

On the northeastern side of the Elevated Fill subarea, the creek bank would be cleared of existing concrete and rock stabilization, a geosynthetic liner would extend down the top of the soft shale bedrock to protect against creek water intrusion during high water conditions. A geocomposite or geosynthetic fabric would be used to protect the liner from puncture during construction. The Creek banks would then be re-stabilized to the top of the 500-year floodplain (approx. 770 feet above mean sea level) using existing bank stabilization materials and additional large rip-rap, as necessary. To collect seeps, a trench would be excavated into the surface of the weathered shale bedrock at the toe of the slope to intercept the seeps. A perforated drainage pipe and granular media will collect and transmit the seep water to one or two small packaged leachate pump stations. If the POTW requires pretreatment, the collected seeps would be treated by aeration using a fine or course bubble diffuser. From the pump station, approximately 4,300 gallons per day of leachate seep water and shallow groundwater, would be conveyed via gravity to the Village of Gowanda's sewer collection system on Palmer Street. The slope of the regraded bank would be lined with a geocomposite drainage layer, leading to the collection trench, and covered by a geomembrane liner to prevent seep breakout and surface water infiltration during high water conditions. The construction and start-up time is estimated to be nine months.

Option B — <u>Bank Stabilization, Collection of Leachate Seep, Treatment and Discharge to Cattaraugus Creek</u>

This option is similar to Option A, however, it would involve on-site treatment of the seep water with direct discharge of the treated effluent to Cattaraugus Creek. The treatment process would utilize biological treatment by a sequencing batch reactor (SBR). The SBR process is a sequential activated sludge process in which all major steps occur in the same tank in order. A single cycle would consist of five discrete periods: fill, react, settle, decant, and idle. The SBR system would first be filled with leachate seep water from a holding tank and aeration would begin. Depending on discharge limits, it may be necessary to post-treat the bio-treated effluent to remove inorganic compounds and/or suspended solids before discharging to the creek. The construction and start-up time is estimated to be 12 months.

Capital Cost:	4/A	$1,776,000
	4/B	$2,325,000

Annual O & M Cost:	4/A	$ 29,000[3]
	4/B	$ 86,000
Present-worth Cost:	4/A	$2,222,000
	4/B	$3,647,000
Construction Time:		17 - 20 Months

ALTERNATIVE 5: EXCAVATION/CONSOLIDATION/ CONTAINMENT WITH PART 360- EQUIVALENT DESIGN BARRIER CAP/ A GROUNDWATER DIVERSION SYSTEM/INSTITUTIONAL CONTROLS

This alternative would be identical to Alternative 4, above, except that the waste in the 5-acre Elevated Fill Subarea would be contained with a low permeability equivalent design barrier cap consistent with 6 New York Code Rules Regulations Part 360. Five-year reviews, and one of the two leachate seep collection, treatment, and disposal options described in Alternative 4 would be included. The cap would consist of the following components:

6-12 inches topsoil
18-24 inches protective barrier low permeability material.

Capital Cost:	5 /A	$2,055,000
	5/B	$2,625,000
O & M Cost:	5/A	$ 31,000
	5/B	$ 88,000
Present-worth Cost:	5/A	$2,571,000
	5/B	$3,971,000
Construction Time:		20-23 months

<u>Additional Components of the Remedial Action Common to the Containment Portion of Alternatives 4 and 5</u>

All of the containment alternatives, consistent with NYSDEC closure requirements, would require post-closure operation and maintenance to operate and maintain the vegetative cover and gas venting systems. In addition, a gas, air, and groundwater monitoring program would be required.

Current New York State landfill closure regulations require the installation of a passive gas venting system comprised of at least one gas vent riser per acre, to minimize landfill gas build-ups within the

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[3] The O&M costs for Alternative 4A and 5A do not include any user fees that may be charged by the POTW for the treatment of leachate.

fill. If levels of VOCs or methane in landfill gases are expected to be high, then an active system would be appropriate.

In general, methane gas levels in the landfill waste at the Elevated Fill Subarea during the RI were detected in two samples up to 31.1%. Levels of other non-methane VOCs were detected at levels slightly above guideline values. Since the level of these VOCs are non-detect at the landfill surface under current conditions, it is expected that the levels of both methane and non-methane VOCs would be reduced once a venting system is in place. Therefore, based on landfill characteristics, it is anticipated that a passive gas venting system would be the appropriate method for gas control. However, the passive system would be designed and monitored so that it could easily be converted to an active system should levels of VOCs be detected in excess of ARAR emission standards. After the installation of the final cap and venting system, two quarterly rounds of sampling of the gas vents for methane and non-methane VOCs would be conducted. The sampling results would be utilized to determine whether the installed venting system is adequate or additional venting is necessary or whether it is necessary to convert the system to an active system with treatment of gas.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA Section 121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 C.F.R. §300.430(e)(9), and OSWER Directive 9355.3-01 (*Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA: Interim Final*, October 1988). The detailed analysis consisted of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following "threshold" criteria are the most important and must be satisfied by any alternative in order to be eligible for selection:

1. *Overall protection of human health and the environment* addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. *Compliance with ARARs* addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and regulations or provide grounds for invoking a waiver. Other federal or state advisories, criteria, or guidance are TBCs. TBCs are not required by the NCP, but the NCP recognizes that they may be very useful in determining what is protective of a site or how to carry out certain actions or requirements.

The following "primary balancing" criteria are used to make comparisons and to identify the major tradeoffs between alternatives:

3. *Long-Term effectiveness and permanence* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. *Reduction of toxicity, mobility, or volume through treatment* is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.

5. *Short-term effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

6. *Implementability* is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. *Cost* includes estimated capital, O&M, and net present-worth costs.

The following "modifying" criteria are used in the final evaluation of the remedial alternatives after the formal comment period, and may prompt modification of the preferred remedy that was presented in the Proposed Plan:

8. *State acceptance* indicates whether, based on its review of the RI/FS report, RI/FS report addendum, and Proposed Plan, the State concurs with, opposes, or has no comments on the selected remedy.

9. *Community acceptance* refers to the public's general response to the alternatives described in the RI/FS report, RI/FS report addendum, and Proposed Plan.

A comparative analysis of these alternatives based upon the evaluation criteria noted above, follows.

Overall Protection of Human Health and the Environment

Alternative 1 (no action) and Alternative 2 (institutional controls) are not protective of human health and the environment because they do not minimize infiltration and groundwater flow into the Elevated Fill Subarea, thereby allowing further leaching of contaminants into the aquifer and the surface water; they do not provide control or treatment of the leachate seeps or landfill gases; and they do not protect terrestrial mammals from soil contamination.

Alternative 3 would be the most protective because it would permanently remove the source of contamination to the groundwater and creek, although it would not actively address residual groundwater contamination. Alternatives 4 and 5 would provide good overall protection of human health and the environment by containing waste with a landfill cap, controlling landfill gas through venting, controlling groundwater flow through the Elevated Fill Subarea with a groundwater diversion system and controlling and treating the leachate seeps. Alternative 5 is more protective than Alternative 4 because it requires a thicker cap of low permeability material to reduce infiltration, thereby reducing the generation of leachate which mobilizes contaminants into the groundwater. Options A and B for leachate seep collection, treatment, and discharge considered for Alternatives 4 and 5 are considered to be equally protective of human health and the environment.

Compliance with ARARs

There are currently no federal or state promulgated standards for contaminant levels in soils. However, EPA is utilizing New York State soil cleanup objectives as specified in the soil TAGM (which are used as "To-Be-Considered" criteria). Since the contaminated soils would not be addressed under Alternatives 1 and 2, these alternatives would not comply with the soil cleanup objectives

Action-specific ARARs include 6NYCRR Part 360 requirements for closure and post-closure of municipal landfills and the NYSDEC State Pollutant Discharge Elimination System (SPDES) program. The Part 360 regulations require that the landfill cap promote runoff, minimize infiltration, and maintain vegetative growth for slope stability. Alternative 3 would be subject to New York State and federal regulations related to the transportation and off-site treatment/disposal of wastes. Unlike Alternative 4, Alternative 5 is consistent with an equivalent cap design as specified in 6 NYCRR Part 360. The options for leachate collection, treatment and disposal considered under Alternatives 4 and 5 would be designed to ensure compliance with their associated ARARs, including SPDES limits for discharge to surface water and air emission standards for an air stripper. In addition, approvals from the NYSDEC Division of Fish and Wildlife and the US Army Corps of Engineers would be required prior to work on the creek bank and within the 100-year flood plain.

Chemical-specific ARARs at the Site include State and Federal Maximum Contaminant Levels (MCLs). None of the alternatives would meet chemical-specific ARARs under the Elevated Fill Subarea. However, Alternatives 4 and 5 would be consistent with EPA's groundwater policy to measure the performance of the remedy at the edge of the waste management area when waste is left in place. Although none of the alternatives would restore the on-site groundwater to MCLs, Alternatives 4 and 5 respectively would be progressively effective in preventing and/or reducing further groundwater migration through the waste and into the Creek. By constructing a proper cap to minimize infiltration and a collection system to collect leachate seeps in conjunction with the groundwater diversion system to limit lateral groundwater migration, the Elevated Fill Subarea would no longer be acting as a source of contamination to the groundwater and the Creek. The natural mechanisms of dispersion and dilution would be relied upon to reduce the residual contaminated groundwater throughout the Site. The impact of the groundwater discharge to the creek will also be addressed by the groundwater diversion system, in conjunction with the cap.

Long-Term Effectiveness and Permanence

Alternatives 1 and 2 would involve no active remedial measures and, therefore, would not be effective in eliminating potential exposure to contaminants in soil or groundwater. These alternatives would allow the continued migration of contaminants from the soil to the groundwater. Alternative 3 would be the most effective alternative over the long term by removing the contaminated soils from the Site.

A landfill cap is considered a reliable remedial measure that, when properly designed and installed, provides a high level of protection. Of the two cap alternatives considered in detail, Alternative 4 would be less reliable in protecting human health and the environment than Alternative 5 because it allows more precipitation to infiltrate through the Elevated Fill Subarea which would result in a greater degree of leaching of contaminants to groundwater. Post-closure operation and maintenance requirements would ensure the continued effectiveness of the landfill cap, landfill gas control system, and either of the two leachate system options for Alternatives 4 and 5. Options A and B for leachate seep collection, treatment, and discharge considered for Alternatives 4 and 5 would each effectively reduce the toxicity, mobility, and volume of contaminants in the leachate seeps. However, Option A provides the least risk of failure of process components, as it does not rely on site-specific treatment equipment.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternatives 1 and 2 would provide no reduction in toxicity, mobility or volume. Under Alternative 3, toxicity and mobility of the contaminants would be eliminated by removing the contaminated soil from the property. However, admixing the sludge fill with drier soils in order to meet landfill acceptance criteria would increase the volume of sludge fill requiring disposal. Alternatives 4 and 5 would reduce the toxicity and mobility of the leachate seeps by collecting and treating the leachate. With the groundwater diversion system being utilized in Alternatives 4 and 5, leachate seep generation is expected to be reduced and/or eliminated. Compared to Alternative 4, Alternative 5 would provide greater reduction in the mobility and volume of contaminants by restricting infiltration through a thicker low permeability landfill cap, which would reduce the further leaching of contaminants to groundwater.

Short-Term Effectiveness

Alternatives 1 and 2 do not include any physical construction measures in any areas of contamination and, therefore, would not present any potential adverse impacts to site workers or the community as a result of its implementation.

Alternative 3 could present some adverse impacts to on-property workers through dermal contact and inhalation related to excavation activities but this risk would be minimized through the use of personal protection equipment. In addition, there are short-term risks and the possibility of disruption of the community. These include: an increase in traffic flow along local roads for an approximately nine-month period (21 months if a second construction season is required); noise from heavy equipment use; and strong odors. This traffic would raise dust and increase noise levels locally. However, proper construction techniques and operational procedures would minimize these impacts.

There are short-term risks associated with Alternatives 4 and 5 including increase traffic flow and noise from heavy equipment but to a lesser extent than Alternative 3. Alternative 4 can be implemented more quickly, in 17 to 20 months, while Alternative 5 is estimated to take 20 to 23 months.

Implementability

Alternatives 1 and 2 would be the easiest soil alternatives to implement, as there are no activities to undertake.

Alternative 3 presents many implementability issues including truck traffic coordination through the residential neighborhood and Village, odor and vector control difficulties, sludge dewatering issues, and available landfill capacity at an off-site location. Alternatives 4 and 5 can be readily implemented from an engineering standpoint and utilize commercially available products and accessible technology. However, for the construction of the groundwater diversion system, a specialty contractor would be required.

The treatment of the leachate seep under Options A and B can be implemented. Discharge of the treated leachate to the Cattaraugus Creek (Option B) would require compliance with technological limitations and water quality standards for protection of the creek. Discharge of the leachate to a local POTW may require pretreatment of the leachate, consistent with the pretreatment requirements of the POTW's SPDES permit, to remove inorganic chemicals prior to discharge. In addition, administrative implementability issues related to work on the creek bank which is located within the 500-year floodplain can be expected.

Cost

The estimated capital, operation, maintenance and monitoring (O&M), and 30-Year present-worth costs for each of the alternatives are presented in the table, below. The annual O&M cost for most of the alternatives include groundwater monitoring.

Alternative	Capital	Annual O&M	Total Present-Worth
1	$0	$0	$0
2	$44,000	$9,500	$190,000
3	$12,293,000	$0	$12,293,000
4/A-B	$1,776,000- $2,325,000	$29,000-$86,000	$2,222,000-$3,647,000

5/A-B	$2,164,000- $2,734,000	$31,000-$88,000	$2,680,000-$4,080,000

Alternative 3, excavation, has the highest cost of any alternative with a capital cost of $12.3 million. Of the two containment alternatives, Alternative 4 has the lower capital and O& M costs, resulting in a net present-worth ranging from $2,222,000 to $3,647,000 because it uses less cover and minimal fill. Alternative 5 has the higher cost, with a net present-worth ranging from $2,680,000 to $4,080,000, because it would use an estimated 20,000 CY of fill material to create a base for the landfill cap. The costs noted above for the two containment alternatives include the costs to implement leachate Options A and B which have net present-worth costs of $1.1 and $2.5 million, respectively. However, for option A the costs do not include any user fees that may be charged by the POTW for the treatment of leachate.

State Acceptance

The EPA provided the State of New York with an opportunity to concur with the recommended remedy. Any future letter from the State of New York regarding concurrence on the selected remedy will be added to the Site Repositories.

Community Acceptance

Comments received during the public comment period indicate that the public, although it favors Alternative 3, generally supports the selected remedy. These comments are summarized and addressed in the Responsiveness Summary, which is attached as Appendix IV to this document.

PRINCIPAL THREAT WASTE

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430 (a)(1)(iii)(A)). Identifying principal threat wastes combines concepts of both hazard and risk. The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur.

Consistent with OSWER directive.9380.8-06FS (dated November 1991), EPA compared the results of the risk assessment to the risk level of 10^{-3} (one in a thousand) identified with principal threat waste where treatment alternatives are recommended. The risk levels found at the site were below the level of 10^{-3} where treatment is recommended. The materials located in the Elevated Fill Subarea and FMPA are non-mobile contaminated source materials of low to moderate toxicity and, therefore, can be classified as non-principal threat wastes.

SELECTED REMEDY

Summary of the Rationale for the Selected Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, EPA has determined that Alternative 5A (Excavation/Consolidation/Containment with Part 360- Equivalent Design Barrier Cap, Bank Stabilization/Collection of Leachate Seep/Treatment by Discharge to a POTW/Groundwater Diversion System/Institutional Controls) best satisfies the requirements of CERCLA Section 121, 42 U.S.C. §9621, and provides the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, 40 C.F.R. §300.430(e)(9).

While Alternative 3 and 4 would both effectively achieve the soil cleanup objective, Alternative 3 would be significantly more expensive and would take longer to construct and implement than Alternatives 4 and 5. Alternative 4, although similar to Alternative 5 in cost, would be less reliable in protecting human health and the environment than Alternative 5 because it allows more precipitation to infiltrate through the Elevated Fill Subarea which would result in a greater degree of leaching of contaminants to groundwater. Further, Alternative 4 would not comply with the NYCRR Part 360 regulations. Therefore, EPA and NYSDEC believe that Alternative 5 would effectuate the Site cleanup while providing the best balance of tradeoffs with respect to the evaluating criteria.

The selected remedy is protective of human health and the environment, provides long-term effectiveness, will achieve the ARARs in a reasonable time frame, and is cost-effective. Therefore, the selected remedy will provide the best balance of tradeoffs among the alternatives with respect to the evaluation criteria. EPA and NYSDEC also believe that the selected remedy will utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

Description of the Selected Remedy

The major components of the selected remedy include the following:

- Excavating the three hot-spot areas and consolidating them within the Elevated Fill Subarea, then capping the 5-acre Elevated Fill Subarea of the ILA with a low permeability equivalent design barrier cap, consistent with the requirements of 6 NYCRR Part 360, including seeding with a mixture to foster natural habitat.

- Post-excavation confirmatory soil sampling;

- Backfilling of excavated areas with clean fill;

- Collecting the leachate from the seeps, pretreating the leachate as necessary, then discharging the leachate to the POTW collection system for further treatment and discharge. As a contingency, if treatment of the leachate in the POTW is not available, it would be treated using a sequencing batch reactor and discharged to Cattaraugus Creek. Since the installation of the cap and groundwater diversion system should reduce leachate generation, the volume of seep leachate requiring treatment is anticipated to be reduced or eliminated over time. For this reason, POTW treatment with any necessary pretreatment would likely be the most cost-effective option and, therefore, the preferred option. The specific treatment and disposal option will be further evaluated during the remedial design phase;

- Installing a groundwater diversion system to limit groundwater migration through the Elevated Fill Subarea. However, should additional data collected in the remedial design phase of the project support the conclusion that the installation of a diversion wall will result in a minimal increase in the collection of contaminants by the leachate collection system, the diversion wall would not be installed;
- Installing a passive gas venting system for proper venting of the 5-acre Elevated Fill Subarea of the ILA;
- Stabilizing the banks of the Cattaraugus Creek;
- Performing long-term operation and maintenance including inspections and repairs of the landfill cap, gas venting, and leachate systems;
- Performing air monitoring, surface and groundwater quality monitoring; and
- Evaluating Site conditions at least once every five years to determine if a modification to the selected alternative is necessary.

This alternative also includes institutional controls for limiting future use of the Site and the groundwater to ensure that the implemented remedial measures will not be disturbed and that the Site will not be used for purposes incompatible with the completed remedial action. To ensure that the engineering and institutional controls remain in place and effective for the protection of public health and the environment, an annual certification, commencing from the date of implementation, must be made by the parties responsible for the remediation.

Summary of the Estimated Remedy Costs

The estimated present-worth costs range from approximately $2,700,000 to $4,000,000 depending on whether the leachate seep is treated by the POTW (selected remedy) or on-site treatment with discharge to Cattaraugus Creek (contingent remedy). This includes an estimated O&M cost ranging from $31,000-$88,000 for 30 years. Table 15 provides the basis for the cost estimates for the selected remedy.

These cost estimates are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual project cost. These cost estimates are based on the best available information regarding the anticipated scope of the selected remedy.

Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedy.

Expected Outcomes of the Selected Remedy

The results of the risk assessment indicate that the Site, if left unremediated, may present an unacceptable risk to park workers and commercial workers from groundwater ingestion and to commercial workers from direct exposure to contaminated soils at the Site.

The selected remedy will allow the following potential land and groundwater use:

Land Use

The Site is currently zoned for industrial use and has been used for this purpose since it was constructed. The remedial action goals considered potential industrial use of the landfill and FMPA and other recreational uses where the exposure frequency and duration would be less than those assumed under the industrial activities. Implementation of the remedy will eliminate potential risks associated with exposure to contaminated soils. Exposure to contaminated soil will be controlled through excavation, followed by containment, and institutional controls. Once implemented, the remedy will help restore the property to beneficial use. The Village of Gowanda would be able to utilize the Site for recreational purposes, walking/bike trail, fishing access, etc., as outlined in the Reuse Assessment and Conceptual Plan.

Groundwater Use

Under the selected remedy, the excavation and containment of contaminated soil will reduce the source of groundwater contamination at the Site. Institutional controls will be established to ensure that groundwater at the Site is not utilized as a source of potable water until MCL levels are attained.

STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. The following sections discuss how the selected remedy meets these statutory requirements

Protection of Human Health and the Environment

The selected remedy, Alternative 5A, will provide permanent overall protection of human health and the environment by containing waste with a landfill cap, by controlling landfill gas through monitoring and venting, and by controlling and treating the leachate seep. By reducing leachate production, the remedy limits further contamination of the ground and surface water.

Compliance with ARARs and Other Environmental Criteria

While there are no federal or New York State soil ARARs, one of the remedial action goals is to meet NYSDEC soil cleanup levels as TBCs. A summary of action-specific, chemical-specific, and location-specific ARARs, as well as TBCs, which will be complied with during implementation of the selected remedy, is presented below and in more detail in Table 16.

Action-Specific ARARs:

- National Emissions Standards for Hazardous Air Pollutants (40 C.F.R. Parts 52 and 61)
- 6 NYCRR Part 200 and 211, New York State Air Regulations for Prevention and Control of Air Contamination and Air Pollution
- 6 NYCRR Part 360, NY State Solid Waste Management Facility Regulations
- 40 C.F.R. Part 258, Criteria for Municipal Solid Waste Landfills

Chemical-Specific ARARs:

- 6 NYCRR Parts 701-703 Groundwater and Surface Water Quality Regulations
- 6 NYCRR Parts 256-257 New York State Air Quality Classifications and Standards

Location-Specific ARARs:

- 40 C.F.R. Part 6, Appendix A Floodplain Management
- 6NYRR Part 662-665 Freshwater Wetlands Act

Other Criteria, Advisories, or Guidance TBCs:

- 40 C.F.R. Part 6.302, Fish and Wildlife Coordination Act
- Soil cleanup levels specified in NYSDEC Technical Administrative Guidance Memorandum No. 94-HWR-4046

Cost-Effectiveness

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (NCP §300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Based on the comparison of overall effectiveness (discussed above) to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost-effective.

The estimated present-worth cost of the selected remedy range from approximately $2,700,000 to $4,000,000 depending on whether the leachate from the seeps is treated by the POTW, the selected preferred remedy, or subject to on-site treatment with discharge to Cattaraugus Creek, the selected contingency remedy. Although Alternative 4, at a cost ranging from approximately $1,800,000-$2,300,000, is less expensive than Alternative 5, it does not meet the threshold criterion of compliance with ARARs because the enhanced soil cap would not minimize infiltration sufficiently to meet the regulatory requirements of the New York State landfill closure and post-closure requirements (6NYCRR PART 360) or the federal requirements contained in 40 C.F.R. Part 258, Subpart F. EPA and the State also believe that the Selected Remedy's combination of containment and leachate collection will provide an overall level of protection comparable to Alternative 3 (excavation and off-site disposal) at a significantly lower cost.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable through collection, treatment, and proper disposal of the leachate seep.

Preference for Treatment as a Principal Element

The statutory preference for remedies employing treatment as a principal element would not be applicable for the Elevated Fill Subarea itself because the landfill waste does not meet the risk-based criteria for principal threat waste, and treatment of the waste is neither practicable nor cost-effective when compared to the other protective remedies. The exact location of any hazardous waste that may have been disposed in the Elevated Fill Subarea is unknown. Therefore, the entire landfill volume, approximately 150,000 tons, would require excavation and removal in order to effectively treat the waste. Odor controls would be required during the removal work due to strong odors expected during sludge fill excavation, handling and transport. Odor controls would be of limited effectiveness, however, for such an excavation. The excavation of such a large volume of waste would provide an overall level of protection comparable to the selected remedy, but at a significantly higher cost. Furthermore, in-situ treatment of waste is technically impractical because no discrete areas, contaminated by high level of an identifiable waste type which represented a principal threat to public health or the environment, were located within the Elevated Fill Subarea. However, the selected remedy calls for treatment of the leachate seep at the Site and, hence, satisfies the preference for treatment for this portion of the remedy.

Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a review of Site conditions will be conducted within five years after the start of the construction to ensure that the remedy is, or will be, protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan was released for public comment in July 2005. The Plan identified Alternative 5A, Excavation/Consolidation/ Containment with Part 360- Equivalent Design Barrier Cap/a Groundwater Diversion System, Institutional Controls, the Collection and Treatment of Leachate Seeps, as the Preferred Alternative for remediation. During the public comment period, new information, in the form of groundwater modeling, indicated that the mass loading to the creek might not change significantly with the addition of the groundwater diversion system. In addition, modeling showed that the leachate collection system would capture the majority of the contaminated shallow groundwater, thus achieving the remedial action objective of minimizing contaminant migration to Cattaraugus Creek and achieving the ambient water quality standards.

Additional data collected during the remedial design phase of the project will be analyzed to assess the conclusions of the modeling study that the majority of the contaminated groundwater flowing through the waste material would be captured by the leachate collection system and that the mass loadings of ammonia and other sludge fill contaminants to the creek would be reduced substantially without a diversion wall. If the design data support this hypothesis, EPA has determined that, as supported by the model and confirmed by the design, the diversion wall would not be necessary to meet the remedial action objectives and the diversion wall would not be installed.